KENTUCKY SITE BANK EVALUATION

June 2008

Department for Energy Development & Independence

Energy and Environment Cabinet
Commonwealth of Kentucky

www.energy.ky.gov

1.0 INTRODUCTION

Kentucky is uniquely situated to be in the forefront of the nation's synthetic fuels industry. The Commonwealth has an abundance of coal, a proven workforce, Flagship University focused on becoming a top ten research facility which includes the world class Center for Applied Energy Research, and a state government united in support for the concept of energy independence for the United States.

In 2006, the Kentucky Legislature passed the Kentucky Energy Security and National Leadership Act (HB 299). The Act required the former Office of Energy Policy (OEP) to develop and implement a strategy for production of transportation fuels and synthetic natural gas from fossil energy and biomass resources. In support of this Act, OEP undertook to establish a "site bank" of sites in Kentucky suitable for commercial-scale coal-to-liquids (CTL) and coal-to-gas (CTG) projects. The purpose of the OEP's goal was to identify locations in or near both the Eastern and Western Kentucky coal fields capable of accommodating a plant having at least 10,000 barrels per day output in liquid fuels, or the equivalent thousands of cubic feet per day of pipeline quality synthetic natural gas. The first nineteen sites were evaluated in 2006 and 2007. The results of the initial assessment of potential sites for CTL/CTG plants indicated that Kentucky has properties and infrastructure available to attract developers, today, for such projects. Sites not immediately ready for development were sponsored by entities who understand the infrastructure and engineering issues necessary to prepare those sites for development.

Subsequently, pursuant to House Bill 1, passed in Special Session in the fall of 2007, government officials, private parties and economic development leaders across Kentucky were again contacted to request additional nominations for a second round of evaluations of suitable CTL/CTG sites.

On June 16, 2008, Governor Beshear effected a reorganization of the executive branch, resulting in the Energy and Environment Cabinet (EEC) of which the Department of Energy Development and Independence (DEDI) is a critical part. The functions of the former OEP have been assumed by the DEDI as of the date of reorganization. This report presents the results of the second round of site evaluations and describes twenty-two new sites which have been nominated for this process.

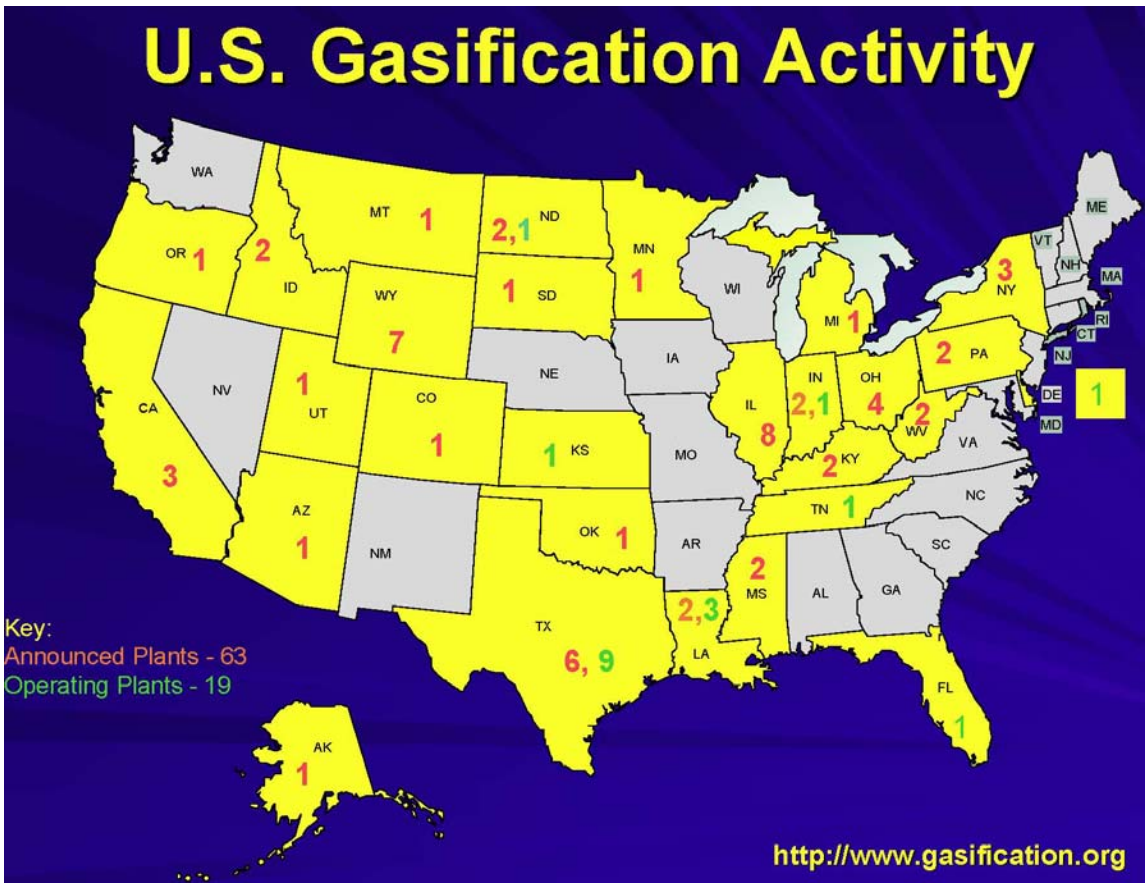
1.1 CTL/CTG: Basics & Industry Overview

Gasification breaks down a carbon-based "feedstock" into its basic constituent elements using high temperatures, pressure, and in some instances, a catalyst. This process enables the separation of

pollutants and other gases to produce a clean synthesis gas (or "syngas"), which can then be burned for efficient electricity generation or converted into clean liquid transportation fuels, chemicals, or synthetic natural gas.

Gasification is not a new technology. Blast furnaces were producing synthesis gases more than 150 years ago. The production of synthesis transportation fuels, primarily from gasified coal and using the Fischer-Tropsch process, experienced a dramatic increase during World War II. According to the U.S. Department of Energy (DOE), more than 92 percent of Germany's wartime aviation fuel and half of its petroleum came from synthesis fuel plants.

China and South Africa are the world leaders in gasification. North America's 15% share of the world syngas capacity is located exclusively in the United States, with 20 gasification-based plants in operation, the majority of which are chemical producers. In 2007, we reported 27 additional projects under development in the United States. In the ensuing year, petroleum and natural gas prices have climbed higher than ever before. Additional projects have been initiated across the United States and Kentucky has seen unprecedented activity ranging from general inquiries about potential sites to the planning and design of large facilities moving forward rapidly.



1.2 Environmental Benefits of Gasification

Since the gasification process occurs in an oxygen-limited state, many pollutants, such as sulfur compounds, are converted to more easily handled compounds (such as hydrogen sulfide) that can be treated in a process stream, rather than more difficult compounds (such as SOx) that have to be treated as flue/stack gas streams in conventional combustion processes. Other pollutants (such as NOx, particulates, mercury, heavy and light metals) can also be treated relatively easily, compared to conventional combustion.

Due to the high reaction temperature and reduced oxygen environment, other organic contaminants (tars, oils, PCBs, furans) are generally destroyed in the gasification process. Additionally, carbon (in the form of carbon dioxide) can be extracted relatively easily and at high pressure for beneficial use, such as enhanced oil recovery, or sequestered. The carbon dioxide must be removed in the gasification process regardless of the ultimate fate of the carbon. With carbon capture, the carbon dioxide must be compressed to 2000 psi, resulting in a 3-4% increase in cost. Ideally this carbon dioxide could be used for enhanced oil recovery. This requires suitable opportunities within a feasible distance from the plant or adequate infrastructure (i.e., carbon dioxide pipelines) to ship the carbon to more distant areas with a need for the product. If sequestration, without enhanced recovery or resale, is the chosen alternative, there is an increased capital and operating cost.

CTL transportation fuels produced from the Fischer-Tropsch process are cleaner than conventional gasoline and diesels. When burned in conventional engines, they have lower particulate and mercury emissions, almost zero sulfur emissions, and no measurable toxic pollutants. Finally, gasification is an efficient method of producing elemental hydrogen for use in fuel cells and future transportation fuels.

1.3 CTL/CTG Benefits for the Commonwealth of Kentucky

The United States currently imports almost 60% of its petroleum needs, nearly half of which come from highly unstable regions and countries. The Energy Information Administration predicts that this dependence on imports will grow to over 70% by 2025 unless the United States takes aggressive steps to develop domestic energy supplies.

To combat this risk, the United States has available the world's largest alternative liquid fuels resource base in the form of coal, biomass, and oil shale to substitute for conventional oil imports. Development of alternative fuels from our resources can move us toward transportation fuel

independence, while at the same time creating millions of jobs, fostering development of new technology, enhancing economic growth, and reducing trade and budget deficits.

For Kentucky, as well as other states, the CTL/CTG industry represents local industrial/economic development; more stable prices for transportation fuels and natural gas; improved and expanded educational opportunities; and long-term markets for Kentucky coal. A typical CTL plant, with an output of 10,000 barrels per day, can create more than 700-1000 construction jobs, 190 full-time jobs on-site, about 240 mining jobs and a significant number of indirect jobs throughout the region. A growing domestic CTL/CTG industry also ensures a stable, long-term market for Kentucky coal.

However, CTL/CTG facilities are costly to construct. For example, a 10,000 barrel per day CTL facility costs roughly $1 billion, while a larger scale 80,000 barrel per day CTL plant would cost upward of $6.5 billion. With every passing year these costs increase. Thus, overcoming these initial high capital costs through federal and state government assistance—in the form of financial and tax incentives, streamlined permitting processes, long-term contracts for the purchase of outputs, and financial guarantees—is critical to jumpstarting the domestic CTL/CTG industry.

2.0 SITE BANK PROCESS OVERVIEW

In September, 2007, industrial, commercial, energy, business, government and economic development leaders throughout the Commonwealth were invited to submit information on potential sites to be evaluated. A letter was sent to every county judge executive, state representative, state senator and area development district in the state. In response to the letter, numerous calls and questions were received from each of the groups contacted, which indicated the high level of interest in the development of alternative use of our abundant coal resources. Twenty-two sites were submitted and thoroughly evaluated. In addition, four "historic" sites located in western Kentucky which had been the subject of substantial research and planning pursuant to a Department of Energy project were submitted for consideration. The four historic sites were researched to determine if they remained a viable possibility for development of an alternative fuels project.

The criteria developed and utilized previously was reviewed to confirm that no changes were necessary based on new research or findings. During the six months following the site submittal, teams of evaluators completed preliminary research, site information evaluations and site visits for each of the sites.

The sites submitted in 2007 reflect a greater emphasis on eastern Kentucky. Several sites located away from Kentucky's traditional coal fields were submitted, some of which offer interesting assets for a CTL/CTG facility. The submitted sites ranged in size from 180 to 5,000 acres and are located from Hickman in Fulton County on the banks of the Mississippi River to Pike and Martin Counties, deep in the eastern coal fields. The proposed sites are divided into three groups, identified as sites in or near the Western Kentucky coal fields, those located outside the coal fields and those in or near the Eastern Kentucky coal fields.

Several sites have potential to successfully support a CTL/CTG facility. Others will require additional infrastructure support or development to be ready for this industry. As these sites are developed and the Commonwealth gains experience with the design requirements, construction and operation of the facilities, sites that may not appear ideal at this moment may become more attractive candidates.

3.0 CRITERIA

Every site submitted was evaluated against a set of criteria applicable to the siting and operation of similar plants around the world. Information regarding inputs and outputs for CTL and CTG plants was gathered and incorporated along with basic site needs. Relative weighting was applied to those criteria that were determined to be particularly important or for which significant cost could be expected. The goal of the evaluation was to determine which sites were most ready and most suitable for development at this time.

The criteria were established by first looking to the physical characteristics that are beneficial to a successful facility, such as size, location, and environmental condition. Other aspects of the site that might be detrimental or cost–prohibitive, such as potential environmental impacts to water quality or threatened and endangered species, were considered. Sensitive conditions such as wetlands and floodplains were reviewed to ensure that the proposed facility would be technically, legally, and environmentally feasible. The needs of a typical facility for feedstock, power, transportation, and workforce were factored as well. The geologic stability of the site and the potential for sequestration of captured carbon was preliminarily evaluated.

Participants in the development of the criteria included SMG, the University of Kentucky's Center for Applied Energy Research (CAER), the Kentucky Geological Survey, the former Office of Energy Policy, now DEDI, and the former Environmental and Public Protection Cabinet, now the Energy and Environment Cabinet. Existing reports such as the Southern States Energy Board's "American Energy Security Study" and CAER's HB 299 Report on CTL and SNG Technologies, July 2007 were reviewed and substantial information imported into the criteria.

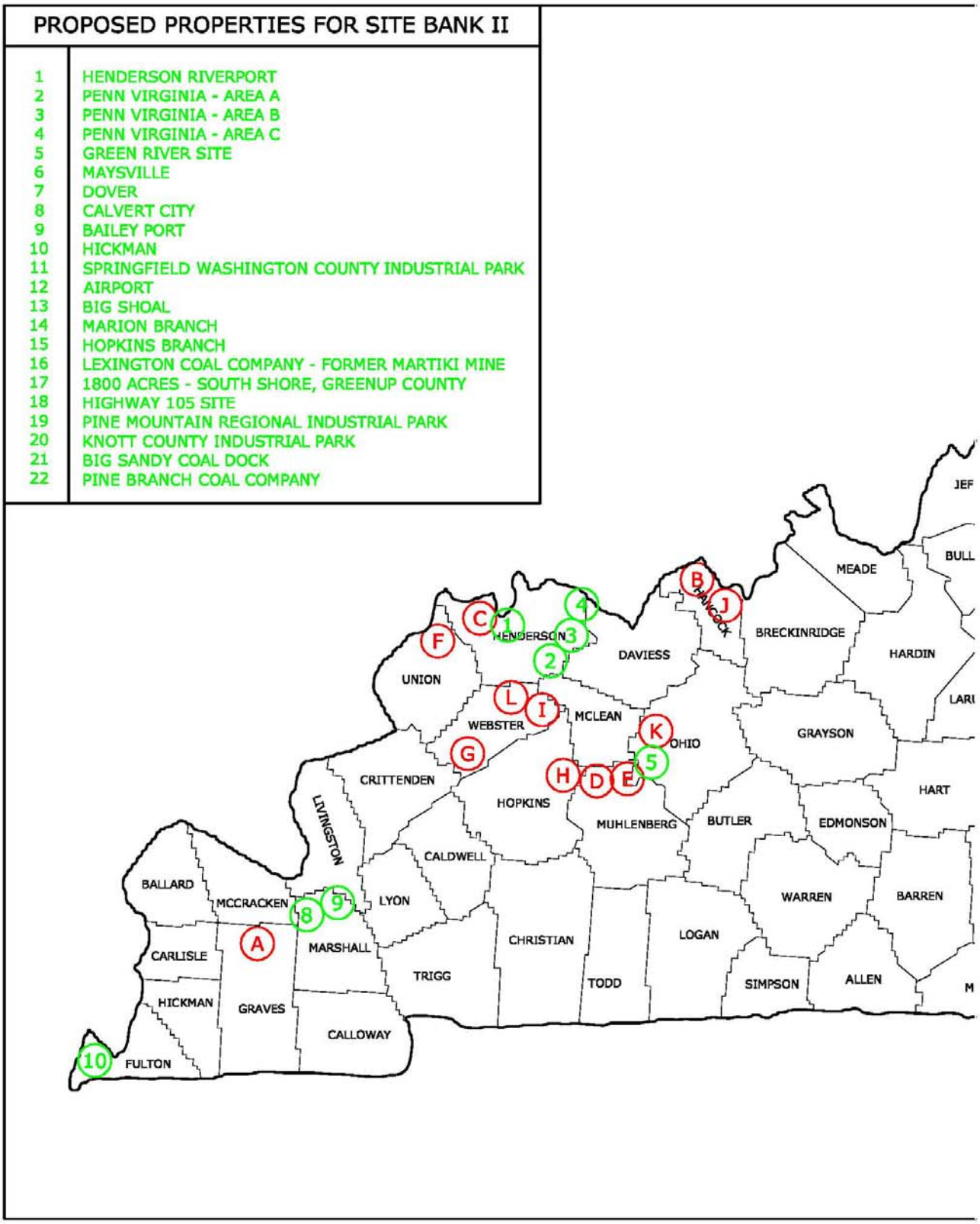
SITE EVALUATION CRITERIA SUMMARY	
Physical Characteristics	• Size • Topography • Access & Control • Floodplains & Wetlands
Geologic Factors	• Seismic Stability • Sequestration Potential • Other Geologic Assets
Other Site Characteristics	• Existing Site Hazards • Presence of Oil/Gas Wells & Lines • Existing Land Use • Road Access • Cooling/Process Water Resources • Airport Proximity
Proximity to Sensitive Areas	• Proximity to Public Access & Class I Visibility Areas • Threatened & Endangered Species • Cultural Resources
Regulatory & Permitting	• Air Quality • Non-attainment/Maintenance Areas • Water Resources
Electricity Transmission	• Power availability • Grid proximity • Voltage • Rights-of-way
Material & Fuel Delivery	• Distance to rail/barge facility access • Delivery mode flexibility • Access to natural gas pipeline • Coal supply environment
Workforce Availability	• Construction workforce • Operational workforce

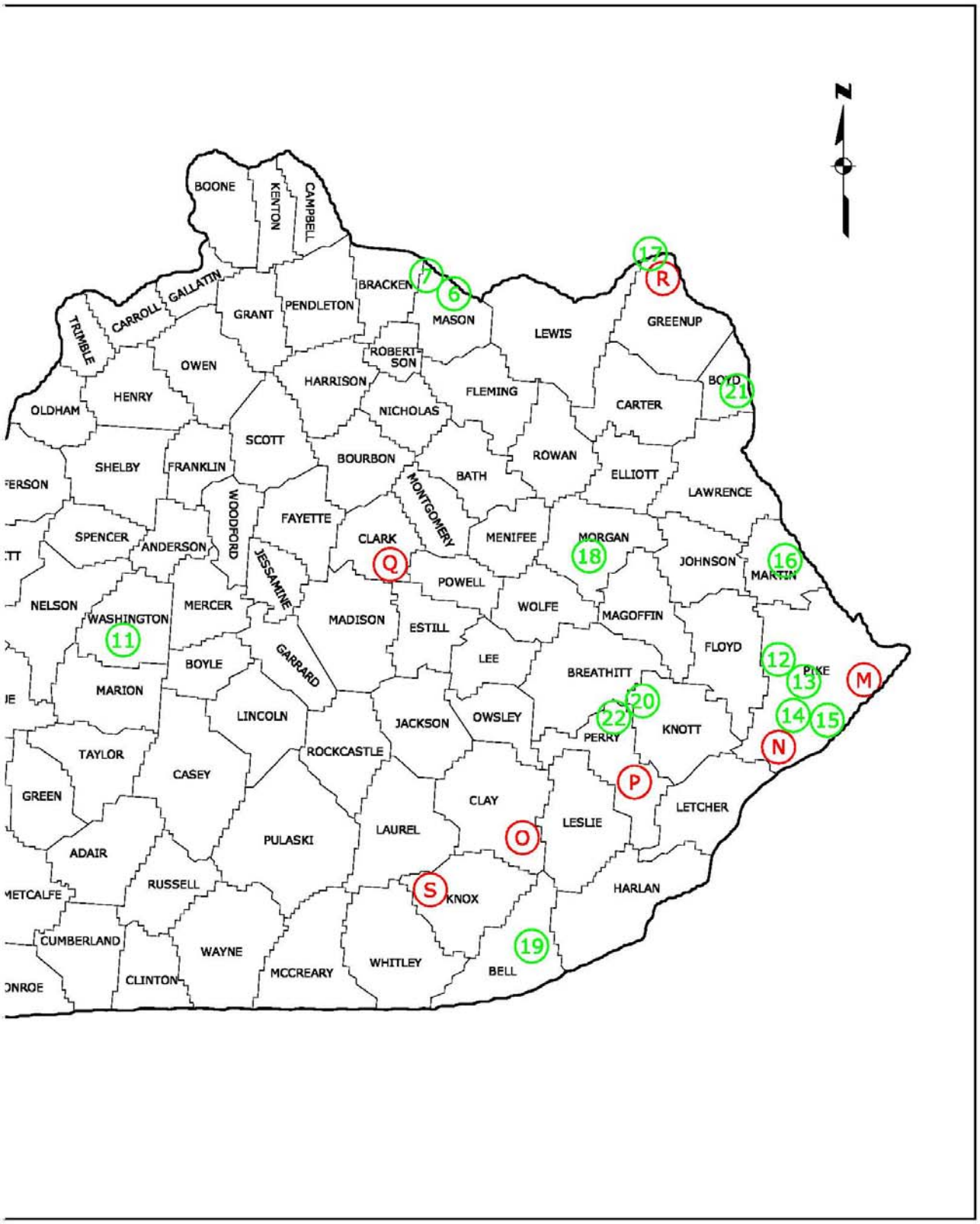
4.0 SITE EVALUATIONS

Each site was evaluated and ranked based upon a site visit, information submitted by the sponsor, and substantial research. The criteria were used to numerically rank the sites and develop a comparison among sites within the same geographic region. Each site sponsor was afforded the opportunity to review the evaluation of the site and provide additional information helpful to the process.

Five sites are located within or near the Western Kentucky coal fields and have been evaluated as a group. Eleven sites are located within or near the Eastern Kentucky coal fields and have also been evaluated as a group. Six sites have been evaluated that are not within the eastern or western coal fields but may present an appropriate and interesting alternative. Following is a map depicting the general location of the sites. Short descriptive summaries for each site, highlighting their strengths and providing additional information on how they can be improved for CTL/CTG development are also included. Full site descriptions and more detailed results of site evaluations may be obtained by contacting the OEP.

	COUNTY	DESCRIPTION OF SITE
WESTERN COAL FIELD SITES	Henderson	**Henderson Riverport**
	Henderson	**Penn Virginia – Area A**
	Henderson	**Penn Virginia – Area B**
	Henderson	**Penn Virginia – Area C**
	Ohio	**Green River Site**
	COUNTY	**DESCRIPTION OF SITE**
NON- COAL FIELD SITES	Mason	**Maysville**
	Mason	**Dover**
	Marshall	**Calvert City**
	Marshall	**Bailey Port**
	Fulton	**Hickman**
	Washington	**Springfield Washington County Industrial Park**
	COUNTY	**DESCRIPTION OF SITE**
EASTERN COAL FIELD SITES	Pike	**Airport**
	Pike	**Big Shoal**
	Pike	**Marion Branch**
	Pike	**Hopkins Branch**
	Martin	**Lexington Coal Company – Former Martiki Mine**
	Greenup	**180 acres - South Shore, Greenup County**
	Morgan	**Highway 105 Site**
	Bell	**Pine Mountain Regional Industrial Park**
	Knott	**Knott County Industrial Park**
	Boyd	**Big Sandy Coal Dock**
	Perry / Breathitt	**Pine Branch Coal Company**


PROPOSED PROPERTIES FOR SITE BANK II
1 HENDERSON RIVERPORT
2 PENN VIRGINIA - AREA A
3 PENN VIRGINIA - AREA B
4 PENN VIRGINIA - AREA C
5 GREEN RIVER SITE
6 MAYSVILLE
7 DOVER
8 CALVERT CITY
9 BAILEY PORT
10 HICKMAN
11 SPRINGFIELD WASHINGTON COUNTY INDUSTRIAL PARK
12 AIRPORT
13 BIG SHOAL
14 MARION BRANCH
15 HOPKINS BRANCH
16 LEXINGTON COAL COMPANY - FORMER MARTIKI MINE
17 1800 ACRES - SOUTH SHORE, GREENUP COUNTY
18 HIGHWAY 105 SITE
19 PINE MOUNTAIN REGIONAL INDUSTRIAL PARK
20 KNOTT COUNTY INDUSTRIAL PARK
21 BIG SANDY COAL DOCK
22 PINE BRANCH COAL COMPANY
MEADE
BRECKINRIDGE
HARDIN
DAVIESS
HENDERSON
UNION
WEBSTER
MCLEAN
OHIO
GRAYSON
CRITTENDEN
HOPKINS
MUHLENBERG
BUTLER
EDMONSON
HART
LIVINGSTON
CALDWELL
BALLARD
MCCRACKEN
LYON
WARREN
BARREN
CARLISLE
MARSHALL
CHRISTIAN
LOGAN
TRIGG
TODD
SIMPSON
ALLEN
HICKMAN
GRAVES
CALLOWAY
FULTON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GALLATIN
CARROLL
TRIMBLE
GRANT
PENDLETON
BRACKEN
MASON
LEWIS
GREENUP
OWEN
ROBERT-SON
HARRISON
FLEMING
BOYD
HENRY
OLDHAM
NICHOLAS
CARTER
SCOTT
SHELBY
FRANKLIN
BOURBON
ROWAN
ELLIOTT
BATH
LAWRENCE
WOODFORD
MONTGOMERY
FAYETTE
SPENCER
ANDERSON
CLARK
MENIFEE
MORGAN
JOHNSON
MARTIN
JESSAMINE
POWELL
NELSON
WASHINGTON
MERCER
MADISON
ESTILL
WOLFE
MAGOFFIN
FLOYD
BOYLE
GARRARD
LEE
BREATHITT
PIKE
MARION
LINCOLN
JACKSON
OWSLEY
PERRY
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CASEY
GREEN
CLAY
LETCHER
LESLIE
PULASKI
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Henderson Riverport, Henderson County

The proposed site, sponsored by the Henderson County Riverport Authority, includes 230 acres in Henderson County. The site is currently used for agriculture amidst an active industrial park and riverport. The site is flat and would require minimal ground work. The site is above the floodplain and does not contain wetlands. No potential sources of environmental contamination exist for the site. Geologic assets are fair, with medium seismic risk and a substantial fault system to the south of the site. No oil or gas wells would require relocation at the proposed site.

The site is located in a coal producing county with access to adequate coal. Water resources typically required for a CTL/CTG facility are readily available from the Ohio River. Discharge from this site would not likely adversely impact the Ohio River. The proposed site includes all basic utilities (i.e., electric, gas, portable water, sewer). Increase in capacity for electric and gas is close to the site. This site has transportation access by rail, road and barge, all of which serve the adjacent riverport. Close proximity to an air quality non-attainment area (i.e., Evansville, Indiana) may influence air permitting for a facility at this location. The take-off and landing zone for the Henderson County Airport, located within ½-mile of the site, impacts the allowable heights for development and may be a safety hazard. Several public access areas, the presence of a historic property near the site's perimeter, and documented threatened and endangered species will require further investigation prior to development of this site.

The labor market includes 7 Kentucky counties, 2 Indiana and 1 Illinois counties for a total of 250,000 potential workers to staff the construction and operation of the facility. The site scored 1051 points, about 88% of the total available points.

Penn Virginia – Area A, Henderson County

This proposed site, sponsored by the Penn Virginia Land Company, consists of 1,000 acres of previously mined land in Henderson County on the Green River, south of the Audubon Parkway. The adjacent property to the southwest is currently under development as a coal gasification facility. Due to former surface mining operations, an investigation would be required to determine the impacts of mining reclamation on potential infrastructure foundations. Most of the developable acres are located out of the 100-year floodplain, and only a small wetland area exists on-site. Oil producing wells are located on site. Geologic assets for the site are fair, with moderate seismic stability. A large area of faulting is located south of the site.

Basic electric is available on site, with gas and water available in the vicinity. Sewer service is not available necessitating the need for on-site treatment services. High capacity gas and electrical transmission points are located within the area. The site is located away from public access areas, and threatened or endangered species should not be impacted by development at the site. Historic/cultural resources are potentially a concern to this site, and should be evaluated prior to development. Ample water intake supply for a CTL/CTG facility is available from the river. A strong coal supply is available in this area and can be transported to the site via road and barge. Rail is not an option for this site. Mine-mouth is a potential at the site.

The labor market includes 6 Kentucky counties, 2 Indiana counties, and 1 Illinois county for a total of 250,000 potential workers to staff the construction and operation of the facility. The site scored 1016 points, about 85% of the total available points.

Penn Virginia – Area B, Henderson County

This proposed site, sponsored by the Penn Virginia Land Company, consists of 1,100 acres of previously mined land in Henderson County on the Green River, south of the Audubon Parkway. The property to the southwest is currently under development as a coal gasification facility. Due to former surface mining operations, an investigation would be required to determine the impacts of the mining and reclamation on potential infrastructure foundations. Most of the developable acres are located out of the 100-year floodplain, and only small wetland areas exist on-site. Oil producing wells are located on site. Geologic assets for the site are fair, with moderate seismic stability. A large area of faulting is located south of the site.

Basic electric is available on site, with gas and water available in the vicinity. Sewer service is not available necessitating the need for on-site treatment services. High capacity gas and electrical transmission points are located within the area. The site is located away from public access areas, and threatened or endangered species should not be impacted by development at the site. Historic/cultural resources are potentially a concern to this site, and should be evaluated prior to development. Ample process water supply for a CTL/CTG facility is available from the river. A strong coal supply is available in this area and can be transported to the site via road and barge. Rail is not an option for this site. This site has a potential for being a mine mouth facility

The labor market includes 6 Kentucky counties, 2 Indiana counties, and 1 Illinois county for a total of 250,000 potential workers to staff the construction and operation of the facility. The site scored a total of 1006 points, about 84% of the total available points.

Penn Virginia – Area C, Henderson County

This proposed site, sponsored by the Penn Virginia Land Company, consists of 500 acres of previously mined land in Henderson County on the Green River, immediately south of the Audubon Parkway. Due to former surface mining operations, an investigation would be required to determine the impacts of mining and reclamation on potential infrastructure foundations. Most of the developable acres are located in the 100-year floodplain, and a large wetland area exists on-site. Floodplain and wetland issues would require mitigation and interface with the US Army Corps of Engineers. Oil producing wells are located on site. Geologic assets for the site are fair, with moderate seismic stability. A large area of faulting is located south of the site.

Basic electric service is available on site, with gas and water available in the vicinity. Sewer service is not available necessitating the need for on-site treatment services. High capacity gas and electrical transmission points are located within the area. The site is located away from public access areas, and threatened or endangered species should not be impacted by development at the site. Historic/cultural resources are potentially a concern to this site, and should be evaluated prior to development. Ample process water supply for a CTL/CTG facility is available from the river. A strong coal supply is available in this area and can be transported to the site via road and barge. Rail is not an option for this site. This site has the potential to be a mine mouth site.

The labor market includes 6 Kentucky counties, 2 Indiana counties, and 1 Illinois county for a total of 250,000 potential workers to staff the construction and operation of the facility. The site scored a total of 956 points, about 80% of the total available points.

Green River Site - GRADD, Ohio County

The Green River proposed site, sponsored by the Green River Area Development District, includes a 1,246 acre agricultural tract located in Ohio County. The site is flat, with areas along the southern portion that are hilly and would require some preparation for development. Sites adjacent are used for coal preparation and power generation. Much of the site is located within the floodplain, and some wetlands are present. Geologic assets for the site are moderate with low seismic risk, and a substantial fault system noted both north and south of the site. The site is in a coal producing county.

Water resources typically required for a CTL/CTG facility are readily available from the Green River. Electric service, water, and sewer are also available at the site. Immediate access to significant levels of power service is available. Interior site roads would need significant upgrades. The site also benefits from barge access and a former rail connection with potential for reactivation if a portion of the spur is rebuilt. Oil and gas are produced in the area. One oil well was observed and may need to be possible relocated. No public access areas exist and no historical/cultural resources exist that would require investigation. The potential presence of threatened/endangered species in the area will require further investigation and planning prior to development. No cultural/historic resources were identified.

The labor market includes 9 Kentucky counties and 1 county in Indiana for a total of 175,000 potential workers to staff the construction and operation of the facility. The site scored a total of 1049 points, about 87% of the total available points.

Maysville, Mason County

The Maysville proposed site, sponsored by Maysville-Mason County Industrial Development Authority, includes 380 acres adjacent to the Ohio River, west of Maysville and east of a major electrical generating station. The site is currently used for agricultural purposes and little or no ground work is necessary for site development. The site does not include any documented wetlands. Geologic assets for the site are poor with very low seismic risk, a few faults in the area and no available gas and oil wells within the site.

Water, sewer, gas and electric are available at or adjacent to the proposed site. Additional available capacity to industrial level gas and electrical services also exist. The portion of the site closest to the river lies within the 100 year flood plain, but the primary building site is above the floodplain. This site benefits from transportation access by rail, road and barge. The site is not located within the Kentucky coal fields, which will result in additional cost to transport coal. Water resources typically required for a CTL/CTG facility are readily available from the Ohio River. Other than a small local airport 8-10 miles from the site, no public access areas exist in proximity to the site although the site is located fairly close to the town of Maysville. The airport is not anticipated to have flight paths over the site. The potential presence of threatened/endangered species and historical/cultural resources on the site will require further investigation and planning prior to development.

The labor market includes 5 Kentucky counties and 3 counties in Ohio for a total of 90,000 potential workers to staff the construction and operation of the facility. The site scored a total of 1014 points, about 84% of the total available points.

Dover Industrial Site – Mason County

This proposed site, sponsored by the Buffalo Trace Area Development District and the Mason County Industrial Development Authority, consists of 983 acres adjacent to the Ohio River just west of Dover in Mason County. Most of the site is flat, and minimal ground work would be required for development. A portion of the site is in the floodplain, but the primary building location is outside of the floodplain. Twenty-three acres of wetlands are present on site, and would require some mitigation and interface with the US Army Corps of Engineers. No oil and gas wells or gathering lines are present on-site that would require re-location. Geologic assets for the site are poor, with low seismic risk. Gas and oil fields are not abundant in the area.

The site is located away from public access areas, including an airport. Cultural/historical resources may be a concern to the site. A historic house and cemetery are located on site, and 82 properties with potential historic significance are located within 100 meters of the site. Threatened or endangered species may be of concern along the Ohio River. Ample process water supply for a CTL/CTG facility is available from the river. Basic electric is available at the site. Potable water, sewer, and gas are not currently available, but are readily accessible. Additional investigation to determine the availability of additional capacity for electrical and gas services will be needed. Road and rail are located at the site, but currently, barge is not. The site has adequate access to construct a barge facility along the river. The site is not located in a coal producing county.

The labor market includes 7 Kentucky counties and 4 Ohio counties for a total of 85,000 potential workers to staff the construction and operation of the facility. The site scored a total of 899 points, about 75% of the total available points.

Calvert City, Marshall County

The proposed site, sponsored by the Marshall County Economic Development Authority, includes 736 acres located 2-miles from Calvert City. The site is an agricultural tract with a few dilapidated buildings and is characterized as flat to gently rolling. A significant portion lies within the 100 year flood plain, and includes wetlands, such that groundwork and interface with the U.S. Army Corps of Engineers would be required. Geologic assets for the site are limited with moderate to high seismic risk. There are no viable gas and oil wells within 20 miles of the proposed site.

Water resources typically required for a CTL/CTG facility are readily available from the Tennessee River. Basic utility services are not presently active at the site, but access points are nearby. Adequate electricity and an identified route to upload excess power are available at the site. Transportation options include road, rail and nearby barge access. Road upgrades for coal transport will be needed. Additional investigation to confirm the environmental status of an abandoned industrial facility adjacent to the site would be recommended prior to any development activity. The site has the benefit of being located near the Calvert City Industrial Park, allowing for a proposed CTG/CTL to have potential synergies with its neighbors. Additional investigation related to public access areas, cultural/historical issues and threatened/endangered species may be required with the development of this site.

The labor market includes 11 Kentucky counties and 1 county each in Illinois and Tennessee for a total of 133,000 potential workers to staff the construction and operation of the facility. The site scored a total of 959 points, about 80% of the total available points.

Bailey Port Inc., Marshall County

Bailey Port, an operating harbor and port facility, with 2,200 feet on the riverfront of the Tennessee River, proposes a 650 acre site, with 150 acres available along the river. Geologic assets for the site are poor, with moderate seismic risk and several fault systems within the area. No active oil fields were identified within 20 miles the proposed site.

Many assets can be attributed to the site, particularly access to barge, rail, and truck. The 150 acres available on the river consists of a dock and a major coal supply company. Gas, electricity, and potable water currently exist or are readily accessible to the site. Ample process water supply is available from the river. The site has the benefit of being located adjacent to the Calvert City Industrial Park, allowing a proposed CTG/CTL to have potential synergies with its neighbors. No historic resources or significant public access areas would be impacted at this location. The site is not located in the western Kentucky coal field although access to coal is available. Development of this site would require permitting to mitigate affects to wetland and floodplain areas, as well as potential critical habitats. An impaired stream traverses nearby so discharge limitations or additional controls may be required. A small airport is located within 10 miles of the site, and may require some consideration for development of this site.

The labor market includes 11 Kentucky counties, 1 Illinois and 1 Tennessee counties, for a total of 133,000 potential workers to staff the construction and operation of the facility. The site scored a total of 989 points, about 82% of the total available points.

Hickman, Fulton County

The Hickman proposed site, sponsored by the Fulton-Hickman Counties Economic Development Partnership, includes 841 developable acres. The site is located in Fulton County with an additional adjoining acreage of 1,159 potentially available for development. Much of the land surrounding the site is developed or used for agriculture. There are currently no zoning requirements for the County. This site benefits from flat land ready for development and transportation access by rail, road and barge. The Hickman-Fulton Riverport is in close proximity to the site. Primary building site locations are not within the 100 year flood plain.

Basic utilities are not currently present at the site, but are readily accessible. Water resources typically required for a CTL/CTG facility are also available in adequate supply. The site includes several acres of wetlands making further investigation and planning necessary prior to development. Public access areas (i.e. Reelfoot National Wildlife Refuge) that are within 10 miles will need to be considered prior to development. Additional investigation related to threatened/endangered species, and cultural/historical resources is required for the development of this site. Geologic assets for the site are limited, with high seismic risk, and no available gas and oil wells within 20 miles of the site. The site's location in proximity of an airport will require coordination before development of a CTL/CTG facility.

The labor market includes 5 Kentucky and 3 Tennessee counties, for a total of 95,000 potential workers to staff the construction and operation of the facility. The site scored a total of 963 points, about 80% of the total available points.

SWEDA, Washington County

The proposed site, sponsored by Springfield-Washington County Economic Development Authority, includes 325 acres northeast of Springfield, KY. Land available for development is slightly sloped with some flat areas. Surrounding properties are primarily residential and agricultural in nature. The site is not within the 100 year flood plain. There are no federally listed wetlands on site nor are there potential hazards from oil and gas wells or gathering lines on the property. Geologic assets for the site are limited for potential carbon sequestration. The site has relatively low seismic risk and no reported faults within 10 miles of the site.

Water, sewer, gas and electric are available at the proposed site. The site is not located within the Kentucky coal fields. There are no rail or barge transportation facilities available. There is a two-lane highway adjacent to the site and a paved road through the site, but these may have to be upgraded for coal transport. The nearest cooling water resource for a CTL/CTG facility is located two miles northwest of the site; thus, no water resources are near the site for adequate water withdrawal or wastewater discharge. Other than a small local airport 7.5 miles south of the site, no public access areas exist. The airport is not anticipated to have flight paths over the site. The potential presence of threatened and endangered species and historical/cultural resources will require further investigation and planning prior to development.

The labor market includes 11 Kentucky counties for a total of 180,000 potential workers to staff the construction and operation of the facility. The site scored a total of 727 points, about 61% of the total available points.

Airport Site, Pike County

The Pike County Airport Site, sponsored by the Pike County Fiscal Court and Summit Engineering, includes 633 developable acres. The site is located in Pike County just northwest of the Pike County Airport. Historic mining operations have occurred on site, with some current mining on the edge of the property. Geologic assets for the site are moderate, with low seismic risk, and available gas and oil wells within 20 miles of the site.

This site benefits from its location in the eastern Kentucky coal field. The site is located away from public access areas, historic resources, or other facilities that could negatively impact the development of a site. Floodplain issues, wetlands, and threatened and endangered species are not significant sources of concern to this site. An analysis of water resources in Pike County indicates that discharge from a CTL/CTG facility should not further impact the receiving stream. The site is flat; however, due to former mining operations, an investigation would be required to determine the impacts of the former mining on potential infrastructure foundations. The site currently lacks viable transportation routes; an unimproved road exists on site and would require significant upgrades to support coal transport via truck; no barge access is available in the area; and the nearest rail access is a mile or greater from the site. No easily accessible means or rights of way for potable water or electricity exist. The nearest potential water intake is located 3.5 miles from the site, and has a documented low flow. Pumping and piping to the site would be costly. The site's location in proximity to the airport presents safety concerns for a CTL/CTG facility.

The labor market includes 5 Kentucky counties and 1 county in West Virginia, for a potential total of 100,000 workers to staff the construction and operation of the facility. The site scored a total of 730 points, about 61% of the total available points.

Big Shoal – Pike County

The Pike County Fiscal Court, with assistance from Summit Engineering (SE), has proposed this 215 acre site. The site is located south of Coal Run Village in Pike County, on the south side of the Levisa Fork and US 23. The site has been used for deep and surface mining and currently, some deep or auger mining is occurring adjacent to the site. An extensive Feasibility Study has been prepared for interested developers. Geologic assets for the site are fair, with low seismic risk. Gas fields are abundant in the area.

The site is located away from public access areas, except for an airport where coordination may be required prior to development. Floodplain issues, threatened or endangered species, and historic/cultural resources are not a significant concern to this site. Potable water, basic electric, and gas are not currently available, but are readily accessible. The site is located in Pike County, which is rich in coal. Due to existing site conditions, significant groundwork and minor wetland mitigation would be required for the site. Road and rail are located at the site, but barge is not. Some improvements would be required to the road and rail. Gas lines and wells would also be required to be re-located at the primary building site. An evaluation to determine if an adequate supply of raw water is available in the area would be necessary.

The labor market includes 6 Kentucky counties and 1 West Virginia county for a potential total of 100,000 workers to staff the construction and operation of the facility. The site scored a total of 814 points, about 68% of the total available points.

Marion Branch, Pike County

The Marion Branch proposed site, sponsored by Pike County Fiscal Court and Summit Engineering, includes 648 acres. The site is currently an active mine and is highly disturbed. Extensive groundwork will be required for development of this site. Wetlands are not present on site. Primary building sites are not within the 100 year flood plain. Geologic assets for the site are good with very low seismic risk. Gas and oil wells located on or near the site will need further investigation and relocation.

Transportation options will be limited to rail or road access, with no access to barge in the area. Since this site is located in Pike County, coal is readily available. A coal load out facility is located at the entrance to the property and a large rail yard is located within a couple of miles. The availability of water resources to supply the typical need of a CTL/CTG facility is not adequate at this time and the natural drainage from the site is within 5 miles upstream from Pikeville's public water intake. Basic utilities (i.e., electric, gas) while not presently installed, are available near the site. Increased capacity for these services also exists nearby. The accessibility of potable water and sewer to the site will have to be evaluated prior to development. Investigation and planning may be required to address questions relating to public access areas and threatened/endangered species as part of the development process. Since the site is a mine, historical/cultural resources should not be a concern at this site location.

The labor market includes 6 Kentucky counties and 1 county in West Virginia for a potential of approximately 100,000 workers to staff the construction and operation of the facility. The site scored a total of 881 points, about 73% of the total available points.

Hopkins Branch, Pike County

The proposed site, sponsored by the Pike County Fiscal Court and Summit Engineering, includes 216 acres located in Pike County. The site is an active surface mine with a large retention basin at the head of the hollow, and will require some groundwork prior to development. The site is rural and isolated from residential development, and no zoning requirements are currently applicable. The site is above the 100-year floodplain, and does not include wetlands. Geologic assets for the site are fair with low seismic risk. The site is located within the Big Sandy Gas Field.

Potable water and sewer are not present and active at the site, and are not readily available. Basic electricity and gas is available on site; however, the location and available capacity to upgrade electrical services is unknown at this time. This site benefits from transportation access by rail and road, but has no barge access. Gas/oil wells and gathering/transmission lines located on or near the site will need to be re-located prior to development. Water resources typically required for a CTL/CTG facility are not adequately present for withdrawal. Discharges from a CTL/CTG should not be a concern at this location. Historical/cultural resources, impacts to threatened and endangered species, and public access areas do not appear to be present and should not impact this site.

The labor market includes 6 Kentucky counties and 1 county in West Virginia for a potential total of 100,000 workers to staff the construction and operation of the facility. The site scored 779 points, about 65% of the total available points.

Lexington Coal Company, Martiki Mine, Martin County

The proposed site, sponsored by Lexington Coal Company, includes 5,000 acres located in Martin County. The site is flat to rolling with a large dammed stream to the south of the property. The site is a reclaimed surface mine, which may require significant grading and groundwork to prepare suitable flat areas for development of a facility. The primary building site is above the floodplain, however, the site includes wetlands which will require further investigation and planning prior to development. The site is located within the eastern Kentucky coal fields. Geologic assets for the site are good with low seismic risk and viable gas and oil wells surrounding the site.

The site has minimal threat of existing environmental risk. Gas and electric adequate for the facility are available at the proposed site, with increased capacity for these services (i.e., Inez substation on site). The accessibility of potable water and sewer to the site will have to be evaluated prior to development. This site benefits from transportation access by rail and road, but has no barge access. Petercave Lake is located within the site boundaries and can accommodate the typical withdrawal requirements of a CTL/CTG; however, in drought conditions a contingency plan will need to be considered. Discharges from a site at this location would not further impact the nearest stream. Public access areas, critical habitats for threatened or endangered species, and historical/cultural resources should not be impacted by the development of a facility at this location.

The labor market includes 5 Kentucky counties for a total of 60,000 potential workers to staff the construction and operation of the facility. The site scored a total of 1081 points, about 90% of the total available points.

South Shore, Greenup County

The South Shore proposed site, sponsored by Arrington, McGinnis, et al, includes 180 acres, at least 145 of which are developable. The site is located in Greenup County adjacent to the Ohio River. Land available for development is mostly flat with some sloped areas. Much of the land surrounding the site is industrial in nature or used for agriculture. This site benefits from transportation access by rail and road. A neighboring barge facility also exists. Water, sewer, gas and electric are available at the proposed site. No gathering lines, oil or gas wells are on the site. This site is at the northern edge of the eastern Kentucky coal fields.

There are no public access areas within close proximity of the site. Water resources typically required for a CTL/CTG facility are adequate. The portion of the site closest to the river lies within the 100 year flood plain, but the primary building site is above the floodplain. The site includes wetlands which will require further investigation and planning prior to development. A natural gas processor is adjacent to the west of the site and an environmentally impaired property lies to the east. Additional investigation related to threatened/endangered species, cultural/historical resources, air quality and impaired water bodies issues may be required with the development of this site. Geologic assets for the site are low to medium, with very low seismic risk, and numerous oil wells within 20 miles of the site.

The labor market includes 4 Kentucky counties, 2 Ohio counties and 3 counties in West Virginia, for a total of 215,000 potential workers to staff the construction and operation of the facility. The site scored a total of 1050 points, about 87% of the total available points.

Highway 205 - Mountain Parkway, Morgan County

The Highway 205 proposed site, sponsored by the Morgan County Government, includes 450 acres located in Morgan County. The proposed site is presently used for agricultural/residential purposes, with a church located approximately 0.25-miles distant. Substantial grading and groundwork will be required before the site is suitable for construction. Primary building sites are not in the 100 year flood plain, but areas along Salem Creek, which traverses the site, are located within the floodplain. Less than one acre of the property is documented as wetlands.

Geologic assets for the site are moderate to low, with low seismic risk and no gas and oil wells on the site. The site has minimal to no threat of existing environmental risk. The site is located in the eastern Kentucky coal fields where coal is abundant. Basic water and electric services are presently available at the site although sewer and gas utility services are not immediately available at the site. Further investigation is needed to access the potential to increase capacity of electric and natural gas services. Transportation options are limited to road access with upgrades needed for coal haul. Water resource supply typically required for a CTL/CTG facility is not adequate (i.e., Grassy Creek) and further evaluation of water resources are required. The Daniel Boone National Forest is within 10 miles, and the West Liberty Airport is 2-miles distant from the site. Consultation with Fish and Wildlife Service is required before development to determine if critical habitats are present. Inventoried historical properties are present within 100 meters.

The labor market includes 8 Kentucky counties for a total of 45,000 potential workers to staff the construction and operation of the facility. The site scored a total of 642 points, about 54% of the total available points.

Pine Mountain Regional Industrial Park, Bell County

The proposed site, sponsored by Pine Mountain Regional Industrial Development Authority, includes 500 acres 7-miles southeast of Pineville. The site is not within the 100 year flood plain. There are no listed wetlands on site, but there is a large pond near the northern perimeter of the primary building site location. Geologic assets for the site are fair. The site has relatively low seismic risk; however, a substantial fault system is present to the north and west. Gas wells and gathering lines are located on the site, and some will likely have to be relocated prior to development. The site location gives access to coal resources. No potential threats to historical/cultural resources exist at the site location.

The Cumberland River will be an adequate raw water supply for the site. Transportation options will be rail or road access, but not barge. The site is a former surface mine and is fairly flat; and the presence of uncompacted fill will require significant groundwork at the site. Potable water and sewer are not located at the site, but basic electric and gas are present. Available capacity of industrial electric and gas services at this site is located nearby. Investigation may be required to determine the impact of CTL/CTG development on a nearby national and state park, as well as critical habitats for threatened and endangered species. A local airport is 10 miles from the site.

The labor market includes 6 Kentucky counties, 1 Virginia county and 2 counties in Tennessee for a total of 90,000 potential workers to staff the construction and operation of the facility. The site scored a total of 973 points, about 81% of the total available points.

Knott Industrial Site, Knott County

The Knott County proposed site, sponsored by Knott County Fiscal Court and Summit Engineering, includes 760 acres located 7-miles northwest of Hindman, KY. The site is a former coal mine with active mining on the adjacent property. Some groundwork would be required at the site before it is suitable for facility construction. Primary building sites are not within the 100 year flood plain, and less than one percent of the property is wetlands. Geologic assets for the site are good with low seismic risk. There are viable gas and oil wells within 20 miles of the proposed site.

Currently, industrial electric and gas are not located on the site, but basic service is available. The potential to increase these services will need further investigation. Other utilities (i.e. potable water, sewer) are not available at the site, but projects are currently underway to remedy this lack. Transportation options will be limited to road access. A new bridge and improvements to the existing roads are planned for this site. Gas and oil wells, and gathering lines located on or near the site, will need to be relocated prior to development. Water resource supply typically required for a CTL/CTG facility is not adequate for withdrawal or suitable for discharge (Troublesome Creek) and will need further study. The site is within the Cyprus Amax Wildlife Management area and in close proximity to a portion of the Robinson Forest, which could impact to the development of this site. Further investigation into the presence of threatened/endangered species may be required.

The proximity of this site to an airport (within 8.5-miles) may have to be considered. No cultural/historical resources are identified at the site.

The labor market includes 4 Kentucky counties for a total of 89,000 potential workers to staff the construction and operation of the facility. The site scored 669 points, about 56% of the total available points.

Big Sandy Coal Dock – Boyd County

This proposed site, sponsored by General Coal Services, LLC, consists of 385 acres and consists of two separate parcels west of the Big Sandy River near Catlettsburg. Eighty-five acres of the site is an active multi-loading coal dock on the river, with the remaining undeveloped 300 acres northwest across US 23. Geologic assets for the site are moderate, with low seismic risk. Oil and gas fields are abundant in the area.

The site is located away from public access areas (including airports) and other facilities that could negatively impact development. Wetlands and threatened and endangered species are not significant sources of concern to this site. Potable water, basic electric, and gas are currently available on site or close by. Since the site is an existing coal dock, access to coal from road transport, rail and barge is established. The site is within the eastern Kentucky coal fields, assuring adequate supplies of coal. An ample supply of process and cooling water is available from the river, and discharges from this location would not impact current water resources. Prior to development, additional study and planning may be required to address cultural and historical resources, floodplain issues, as well as an environmental assessment to ensure that current operations are not detrimental to the site. Grading and groundwork will be required for the 300 acre parcel. The site is located in an air quality non-attainment designated area for PM 2.5, and in maintenance status for 8-hour ozone; thus, specific controls or limitations may be required via the air permitting process.

The labor market includes 4 Kentucky counties, 2 Ohio and 3 West Virginia counties, for a total of 215,000 potential workers to staff the construction and operation of the facility. The site scored 1113 points, about 93% of the total available points.

Pine Branch Coal, Perry, Breathitt Counties

The proposed site, sponsored by Pine Branch Coal Co., includes 4,000 developable acres. The site is located in the eastern Kentucky coal field 9-miles north of Hazard in Perry and Breathitt Counties. The site is comprised of several contiguous reclaimed surface mines, with half of land being flat and the rest gently sloped. The site does not include substantial wetlands and primary building sites are not within the 100 year flood plain. Geologic assets for the site are excellent, with low seismic risk and some oil production to the north of the site. Gas gathering lines and oil wells located on or near the site may need to be re-located prior to development.

Basic water, gas and electric utility are currently present at the site, but no wastewater treatment facility is located in the area. The availability of upgrades to industrial electric and natural gas transmission points in the area will have to be further investigated. Transportation options will be limited to rail or road access with no barge access in the area. Water resource supply typically required for a CTL/CTG facility is not currently available at this time and will require further investigation. Impacts to the nearby Robinson Forest, as well as habitats for threatened/ endangered species and cultural/historical resources at the site will have to be considered prior to development of this site. The site is located within 4 miles of the nearest airport or air field. The height and activity of required equipment for CTL/CTG facilities can be a hazard to air traffic and will have to be considered.

The labor market includes 11 Kentucky counties for a total of 75,000 potential workers to staff the construction and operation of the facility. The site scored 848 points, about 71% of the total available points.

5.0 CONCLUSION

A number of companies have recently announced their intention to develop coal-to-liquids and coal-to-gas facilities, and efforts are underway to secure financing for these projects. Federal and state laws are being proposed to expedite the deployment of these technologies, and a number of states are aggressively competing to attract these investments. The obstacles to developing these projects include the high cost of capital and uncertainty in the permitting process. Federal legislation, including direct financial assistance, tax incentives, and protections against predatory pricing in oil markets, will help attract capital investment by lowering the financial risks associated with these large projects and increasing returns for investors. Many states are providing additional assistance through economic development incentives and streamlined permitting processes.

The benefits of rapidly developing these projects far outweigh the anticipated costs. The United States has abundant supplies of coal, and coal gasification can provide an important domestic source of energy to protect America's economic and national security interests in the coming decades. Development of this industry in the United States will create tremendous economic and job growth, and result in overall, more stable energy prices. Production of energy by these technologies has environmental benefits as compared to current technologies. Finally, as the United States and other countries explore ways to reduce emissions of carbon dioxide, coal gasification technologies represent an important breakthrough in our nation's ability to produce the large-scale supplies of energy needed for our economy and way of life while managing CO_2 emissions.

The development of this Site Bank is an important step in Kentucky's renewed efforts to attract these projects. The United States abandoned its first attempt to develop a coal-to-liquid fuels industry in the late 1970s in the face of a worldwide abundance of cheap oil. Today, soaring worldwide demand for oil and natural gas is rapidly outpacing available supplies, and U.S. availability of existing supplies is increasingly at risk. With our abundant supplies of coal, skilled workforce, and expertise of our universities, Kentucky is uniquely suited to lead the way toward developing this industry. The Site Bank will help attract and educate potential project developers and serve as an introduction to state and local governments. Additional work is needed to further develop several of these sites. The Site Bank will be updated routinely as the suitability of these sites for commercial-scale gasification projects is improved and as additional sites are identified.

For more information about these sites,

contact the Department for Energy Development & Independence.

kysitebank@ky.gov

500 Mero Street
12th Floor, Capital Plaza Tower
Frankfort, KY 40601
(502) 564-7192 or in Kentucky (800) 282-0868

www.energy.ky.gov